

Fluid collected in minims.	Ammonia in grains per gallon.	Source.
150	1·9712	Erysipelas.
120	·1791	Garden.
55	6·8807	Drains.
90	2·1000	Bed-room.
420	2·9568	Stables.
150	·0985	Victoria Park.

XI. "Contributions to Terrestrial Magnetism.—No. XIII." By General Sir EDWARD SABINE, K.C.B., V.P.R.S. Received June 19, 1872.

(Abstract.)

The author presents this paper as the companion of No. XI. of his Contributions to Terrestrial Magnetism, which contained the Magnetic Survey of the Southern Hemisphere from 40° south latitude to the extreme limit towards the southern pole, as does the present memoir, No. XIII. of the same series, the three magnetic elements from 40° north latitude to the furthest attained limit towards the northern pole. In both papers the mean epoch is the same, viz. 1842·5. Where it has been possible to do so, corrections to this mean epoch have been obtained and applied to earlier and later observations.

The determinations are derived from observers of all countries, and are arranged in zones, each of 5° of latitude, passing round the globe. The Table thus formed contains between 3000 and 4000 stations at which the magnetic elements have been determined. The observers are named, and references are made to the sources from whence their observations are taken. The paper is accompanied by maps of the resulting Isogonic, Iso-clinal, and Isodynamic Lines, executed at the Hydrographic Office.

XII. "On the Law of Extraordinary Refraction in Iceland Spar." By G. G. STOKES, M.A., Sec. R.S. Received June 20, 1872.

It is now some years since I carried out, in the case of Iceland spar, the method of examination of the law of refraction which I described in my report on Double Refraction, published in the Report of the British Association for the year 1862, p. 272. A prism, approximately right-angled isosceles, was cut in such a direction as to admit of scrutiny, across the two acute angles, in directions of the wave-normal within the crystal comprising respectively inclinations of 90° and 45° to the axis. The directions of the cut faces were referred by reflection to the cleavage-planes, and thereby to the axis. The light observed was the bright D of a soda-flame.

The result obtained was, that Huygens's construction gives the true law

of double refraction within the limits of errors of observation. The error, if any, could hardly exceed a unit in the *fourth* place of decimals of the index or reciprocal of the wave-velocity, the velocity in air being taken as unity. This result is sufficient *absolutely to disprove* the law resulting from the theory which makes double refraction depend on a difference of inertia in different directions.

I intend to present to the Royal Society a detailed account of the observations; but in the mean time the publication of this preliminary notice of the result obtained may possibly be useful to those engaged in the theory of double refraction.

XIII. "On a Voltaic Standard of Electromotive Force." By LATIMER CLARK, M.I.C.E. Communicated by Prof. Sir WILLIAM THOMSON, F.R.S. Received May 30, 1872.

(Abstract.)

In the year 1861 a Committee was appointed by the British Association for the Advancement of Science to report on standards of electrical resistance, and subsequently on other standards of electrical measurements. Reports were presented in 1862, 1863, 1864, 1865, and 1867.

They recommended the adoption of a system of electromagnetic units based on the metre and gramme, the relations of the units being such that the unit of electromotive force acting through the unit resistance should give the unit current, and that the unit current flowing for the unit time should give the unit quantity.

They issued standards of resistance (known as the B. A. unit or ohm) and standards of electrostatic capacity, or condensers of such magnitude that when charged with the unit electromotive force they contained a sub-multiple of the unit quantity of electricity (known as the farad).

No material standard of electromotive force has yet been issued. Much difficulty has, in fact, been found in devising such a standard. Mechanical means, such as the rotation of a conductor in a magnetic field of known intensity, are too complicated for ordinary use; thermoelectric couples are extremely variable, and voltaic elements, which would constitute the most convenient form of standard, have been hitherto found singularly inconstant, and therefore inapplicable. The Daniell's element, which has been most frequently used for this purpose, commonly varies five per cent. or more without apparent cause.

From a conviction that if similar conditions could be ensured similar combinations would always give the same electromotive force, the author was led to institute a series of experiments, extending over four years, which led to the discovery of a form of battery that is sensibly constant and uniform in its electromotive force.

The battery is composed of pure mercury as the negative element, the mercury being covered by a paste made by boiling mercurous sulphate in